

# (12) UK Patent Application (19) GB (11) 2 303 953 (13) A

(43) Date of A Publication 05.03.1997

(21) Application No 9816023.9

(22) Date of Filing 31.07.1996

(30) Priority Data

(31) 07214083 (32) 31.07.1995 (33) JP

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(51) INT CL<sup>6</sup>

G08B 3/10

(52) UK CL (Edition O )

G4H HRCU H1A H13D H14A H14B H14G H60  
U1S S2196

(56) Documents Cited

GB 2279476 A GB 2276745 A WO 91/02433 A1  
WO 87/04309 A1

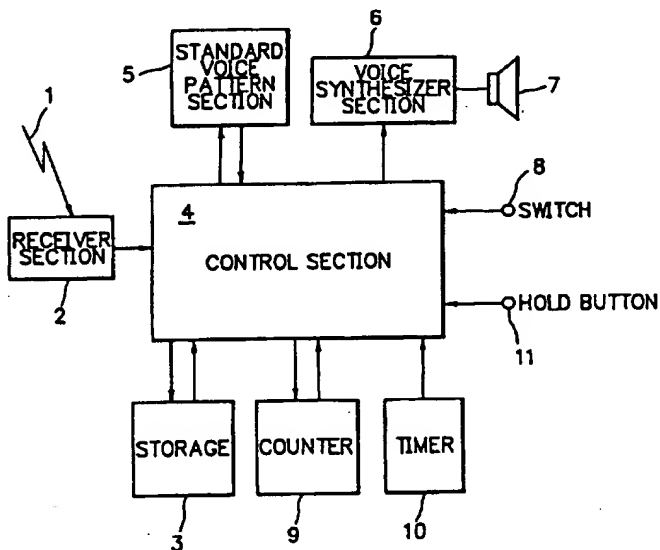
(58) Field of Search

UK CL (Edition O ) G4H HRCU  
INT CL<sup>6</sup> G08B

(54) Pager with vocal output

(57) When a message stored in a storage 3 is output as a voice by means of a speaker 7, a voice pattern section 5 and a voice synthesizer 6, the kind of message is determined in order to automatically provide a fixed interval of time at intermediate points of the message reproduction according to the message type. In the reproduction of a long message, the user can easily hear and write down the resultant message. Message reproduction can also be temporarily interrupted at any time by a hold button 11.

FIG. 2



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FIG. 1 PRIOR ART

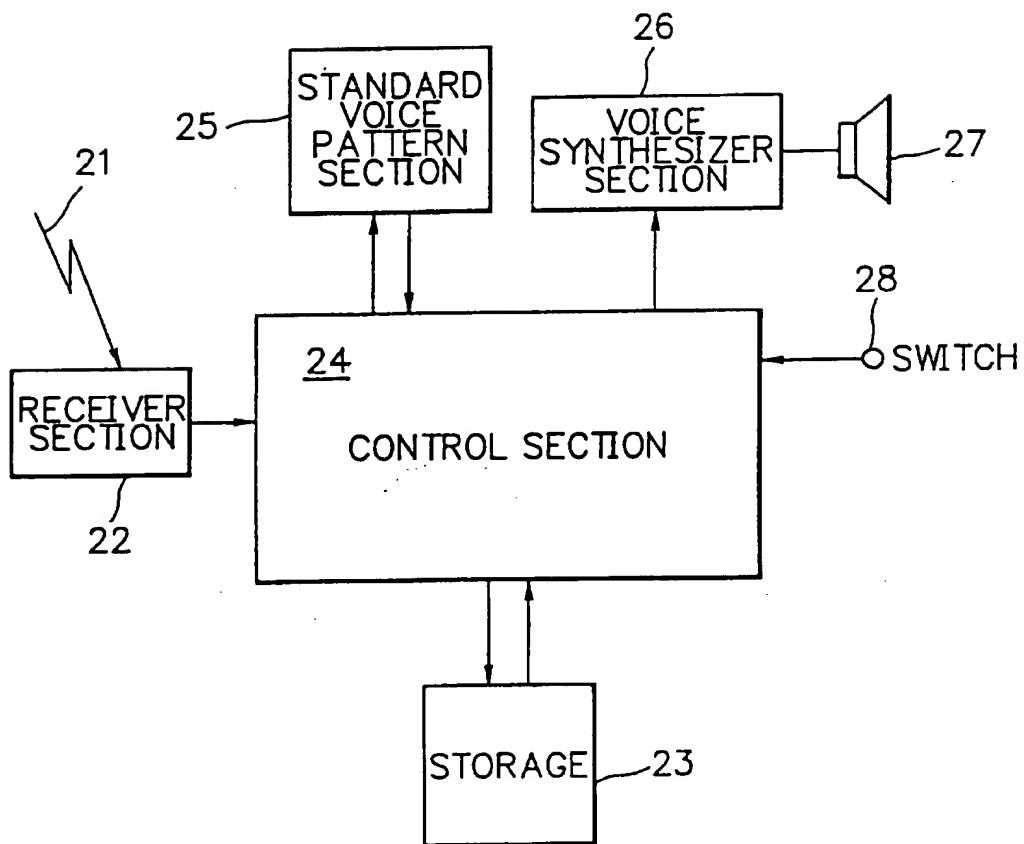


FIG. 2

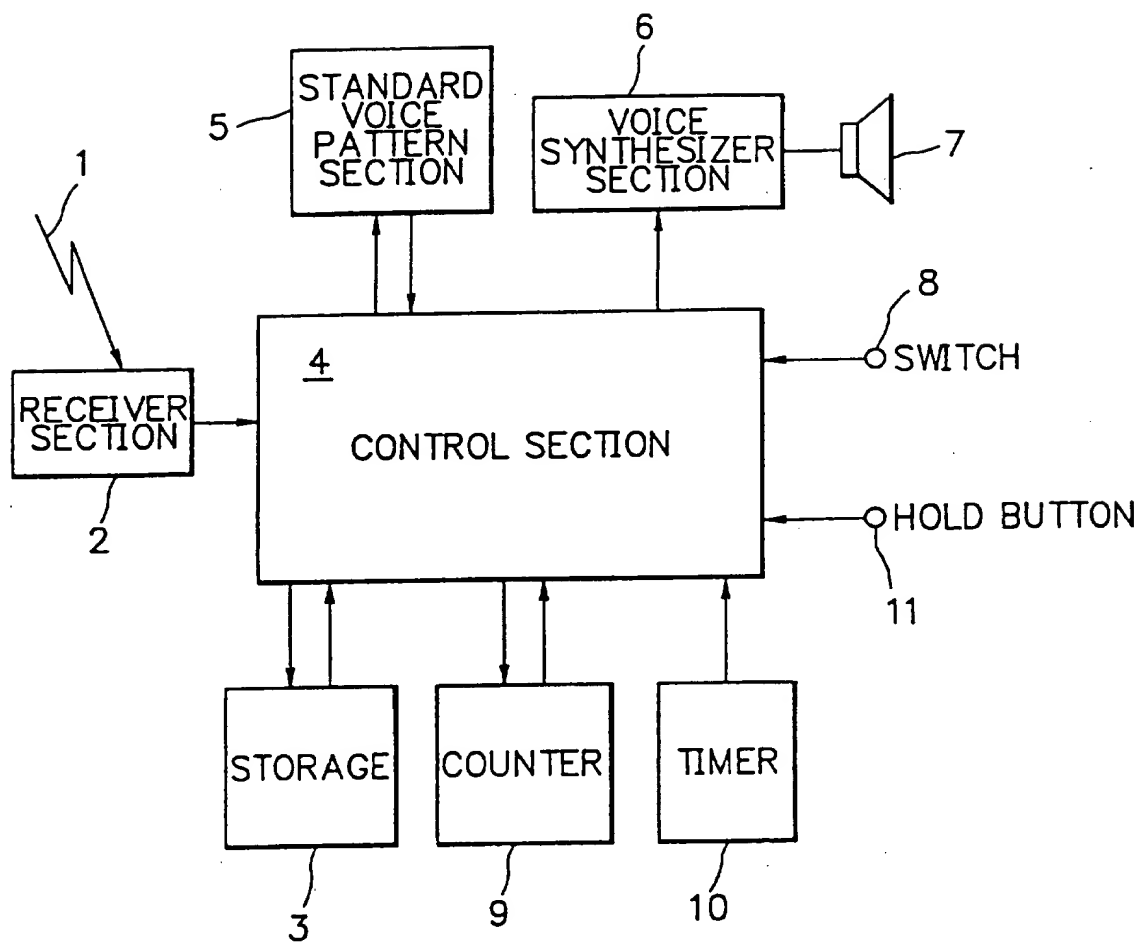
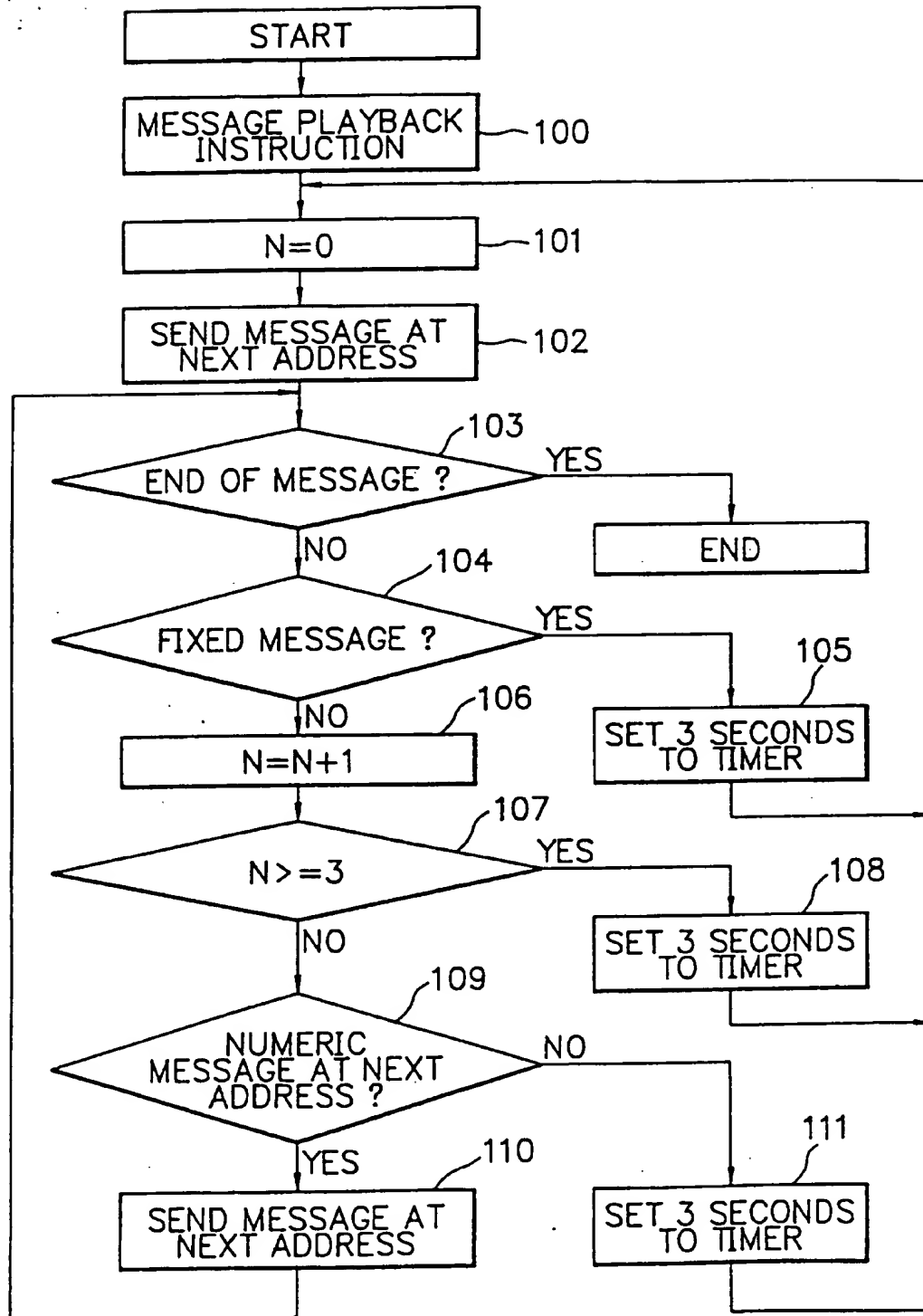


FIG. 3



# FIG. 4

## NUMERICS

ADDRESS NO.	STANDARD VOICE PATTERN
00	0
01	1
02	2
03	3
04	4
05	5
06	6
07	7
08	8
09	9
.	.
.	.
.	.

## WORDS

ADDRESS NO.	STANDARD VOICE PATTERN
20	SHIKYŪ
21	KOTO
22	GA
23	ARU
24	NODE
25	NI
26	KO
27	KE
28	I
29	GOZEN
.	.
.	.
.	.

## FIXED SENTENCES

ADDRESS NO.	STANDARD VOICE PATTERN
50	DENWA O KUDASAI
51	OHAYO GOZAIMASU
52	OYASUMINASAI
53	RENRAKU SHITAI
54	RUSUBANDENWA O KIITE
25	OYASUMINASAI
.	.
.	.
.	.

FIG. 5

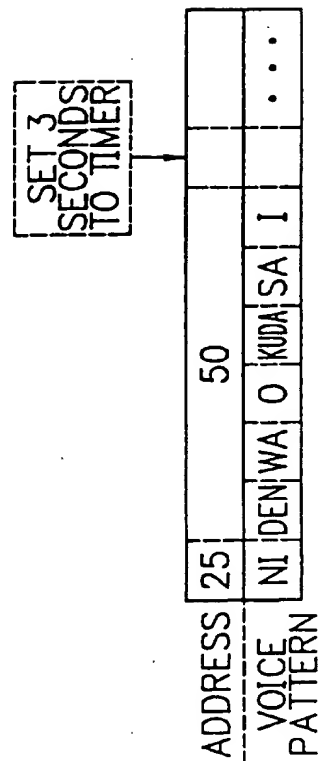
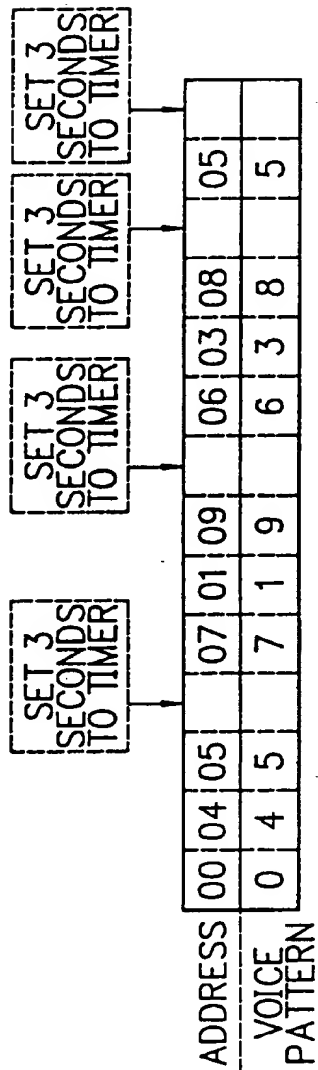
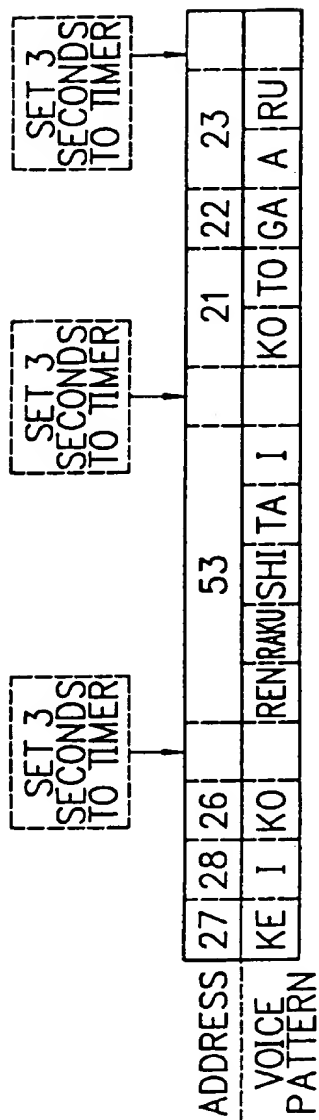
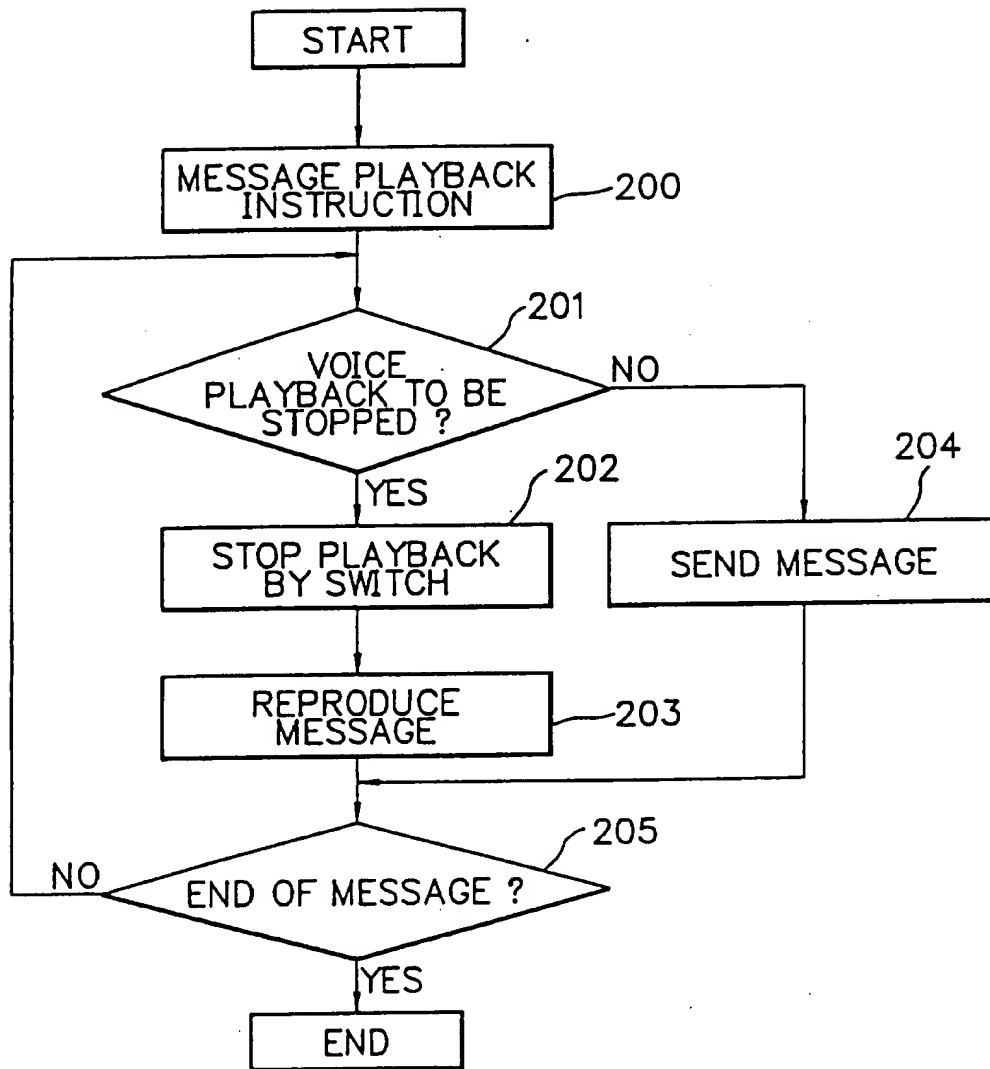


FIG. 6



## PAGER WITH VOCAL OUTPUT

The present invention relates to a pager with vocal output, in particular to a pager used as a radio receiver which receives a message as it is to be vocally reproduced.

A conventional pager with vocal output is constructed so that a received vocal  
5 message, including alphanumeric characters, words, fixed sentences or such like, is stored in the pager. When the user thereof, wishing to listen to the contents of the message, turns on a predetermined switch, a control section of the pager issues an instruction to a voice synthesizer section to reproduce the voice message so that a  
10 speaker of the pager outputs the reproduced voice message. Fig. 1 shows an example of such a conventional pager. A voice message received via a radio transmission path 21 by a receiver circuit 22 is written as data in a storage 23. In the playback or reproduction stage, when a switch 28 is turned on, a control section 24 reads the message data from the storage 23. Thereafter, according to the obtained data and standard voice patterns stored in a standard voice pattern section 25, a voice is  
15 synthesized by a voice synthesizer section 26 for output by a speaker 27.

In such a pager the voice playback operation is accomplished in a fixed manner at a preset voice output rate. When a long message is received, reproduced, and output as a voice by a speaker, it may be possible that the output voice lacks clarity or the contents thereof cannot be appropriately memorized by the user. In  
20 particular, when a message includes numeric characters, which are not easy to memorize, and is reproduced at a high rate, in many cases the user cannot memorize the message in a single reproduction. It is therefore necessary for the user to listen repeatedly to the message, which disadvantageously takes a long period of time.

It is therefore an object of at least the preferred embodiments of the present  
25 invention to provide a pager with vocal output in which, for a long message, the duration of the vocal output may be increased or the voice playback operation can be interrupted temporarily for easy acquisition of the message.



Accordingly, a first aspect of the present invention provides a pager with vocal output, comprising:

5 first storage means for storing therein a received message as a sequence of one or more codes;

second storage means for storing therein a plurality of voice patterns, each voice pattern corresponding to a respective code;

10 voice output means for processing a sequence of one or more voice patterns as they are sequentially output from the second storage means in accordance with said coded sequence to synthesize a voice signal and for responding to the voice signal to output a vocal output corresponding to the received message; and

control means operative to control the voice output means such that said vocal output is interruptible.

15 According to a preferred embodiment of this aspect of the present invention a pager of voice output type comprises first storage means for storing therein a received message as a sequence of corresponding ones of a plurality of predetermined codes, second storage means for storing therein a plurality of voice patterns one-to-one corresponding to the predetermined codes, voice output means for processing a sequence of voice patterns as they are sequentially read out of the plurality of voice  
20 patterns in accordance with the sequence of corresponding predetermined codes, to synthesize a voice signal and for responding to the voice signal to output a corresponding voice so that the received message is voiced, and control means operative to control the voice output means so that the corresponding voice is interruptive.

25 Preferably the plurality of voice patterns includes a plurality of identified patterns, and the control means is operative to

count a number of processed ones of the identified patterns  
and to response to the counted number for controlling the  
voice output means so that the corresponding voice is  
interrupted at a corresponding place therein by a  
5 predetermined time interval.

The plurality of voice patterns may include a  
plurality of first identified patterns representative of  
figures, a plurality of second identified patterns  
10 representative of words and a plurality of third identified  
patterns representative of regular sentences, and the control  
means is responsive to the counted number of processed ones  
of the second identified patterns for controlling the voice  
output means so that the corresponding voice is interrupted  
15 at the corresponding place.

The control means may be responsive to a sequence of continuously  
processed ones of the first identified patterns for  
controlling the voice output means so that the corresponding  
20 voice is interrupted at another corresponding place therein.

Alternatively, or additionally, the control  
means may be responsive to a processed one of the third  
identified patterns for controlling the voice output means so  
that the corresponding voice is interrupted at another  
25 corresponding place therein.

The first, second and third identified patterns may be identified by  
address data thereof in the second storage means.

In a preferred embodiment, the control means includes an operation  
30 member

operative for controlling the voice output means to interrupt the corresponding voice for a voluntary pause.

5       According to a second aspect of the present invention a pager with vocal output comprises storage means for storing therein a received message as a data item; standard voice pattern means loaded with voice patterns corresponding to message data items; voice synthesizer means for synthesizing a voice signal according to the data item stored in the storage means and the voice pattern loaded in the standard voice pattern means; a speaker for transforming the synthesized voice signal of the  
10       message into a vocal output and outputting the vocal output, thereby reproducing the received message; and means for interrupting temporarily the vocal output.

      According to a preferred embodiment of the second aspect of the present invention a pager of voice output type comprises storage means for storing therein a received message as a predetermined corresponding data item, standard voice pattern  
15       means loaded with voice patterns corresponding to the message data items, voice synthesizer means for synthesizing a voice signal according to the data item stored in the storage means and the voice patterns loaded in the standard voice pattern means, a speaker for transforming the synthesized voice signal of the message into a voice and sounding the voice, thereby reproducing the received message, and means  
20       for temporarily interrupting the voice reproduction.

      Preferably, the pager further includes means for counting a number of voice patterns corresponding to a message to be reproduced and inserting a predetermined interval of time at an intermediate point of the reproduced voice according to the counted value.

25       The message may include voice patterns including patterns of a numeral figure, word, and regular sentence, each of the voice patterns being assigned with a predetermined unique value, and an interval of time being provided in the reproduced message each time a predetermined number of respective patterns are reproduced according to the unique value predetermined for the patterns.

In a preferred embodiment, an address number preset to an input message is stored in the storage means, and a kind of the numeral figure, word or regular sentence is decided according to the address number and then the predetermined unique value is determined, thereby providing the interval of time.

5           The pager may further include a hold button, such that when the hold button is depressed, the message reproduction is temporarily interrupted or re-started.

          Therefore, according to the invention, the pager of voice output type in which a received message is stored for  
10           output as a voice message includes a function to interrupt temporarily the output of the voice. That is, the number of voice patterns corresponding to the message to be reproduced is counted so as to insert a predetermined interval of time at an intermediate point of the reproduced voice according to  
15           the counted value. Additionally, the message is separated into voice patterns including patterns of a numeric character, word, and fixed sentence such that each of the voice patterns is assigned with a predetermined unique value and an interval of time is provided in the reproduced message each time a  
20           predetermined number of respective patterns are reproduced according to the unique value predetermined for the patterns. Alternatively, in the configuration of the pager, when the Hold button is depressed, the reproduction of the voice may be either stopped temporarily or re-started.

25           Preferred features of the present invention will now be described, purely by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a schematic block diagram showing the configuration of an example of a conventional pager;

Fig. 2 is a block diagram showing the construction of an embodiment of the pager in accordance with the present invention:

5

Fig. 3 is a flowchart for explaining operation of the pager in accordance with the present invention;

Fig. 4 is a diagram a correspondence between messages and address numbers:

10

Fig. 5 is a diagram specifically showing a relationship between messages and address numbers; and

Fig. 6 is a flowchart for explaining another operation of the pager in accordance with the present invention.

15

Fig. 2 shows in a block diagram the structure of an embodiment of the pager in accordance with the present invention. The pager of this diagram includes a receiver circuit 2 for receiving a radio signal transmitted via a radio transmission path and a storage 3 in which a received message is stored under supervision of a control section 4. The control section 4 is connected to a standard voice pattern section 5, a voice synthesizer section 6, a speaker 7, and a switch 8. The above configuration is similar to that of the conventional pager. In addition, the controller 4 of the embodiment is linked with a counter 9, a timer 10, and Hold button 11.

20

25

30

When storing a message, the storage 3 also stores therein an address, number preset in association with the message. Previously loaded in the standard voice pattern unit 5 are message voices such as numeric characters, words, and sentences of a fixed form which have a one-to-one correspondence with respect to the address numbers stored in the storage 3. When an address number is received, the pattern section 5 outputs therefrom a voice pattern corresponding to the message number. The voice synthesizer 6 produces a voice signal according to a voice pattern inputted thereto and then, sends the signal to the speaker 7, which outputs a vocal output according to the voice signal.

The counter 9 counts the number of messages, i.e., address numbers stored in the storage 3. The timer 10 measures a period of time indicating the duration of the output of voice signals from the voice synthesizer 6. The switch 8 is used, for example, when the user desires to hear a message such that when the switch 8 is set to a playback mode, the message reproduction is enabled. Hold button 11 is utilized to interrupt temporarily the message playback operation.

Fig. 3 is a flowchart to explain an example of the operation of outputting a message from the pager of Fig. 2, whereas Fig. 4 is a diagram showing a message to be reproduced. A message transmitted via the radio transmission path 1 and received by the receiver circuit 2 is stored under supervision of the control section 4 in the storage 3 in the form of an address number corresponding to the message.

The relationship between the messages and address numbers is established respectively for numeric characters.

words, and fixed sentences, for example, as shown in Fig. 4. When it is desired to obtain the stored message, the user sets the switch 8 to the message playback mode and then starts the message reproduction (step 100).

5           The message playback process is basically achieved as follows. Address numbers are sequentially read from the storage 3 to attain from the pattern section 5 the associated numeric character, word, and fixed sentence such that the obtained items are transformed by the

10 synthesizer 6 into voice signals to be outputted by the speaker 7. In operation, the synthesizer 6 converts the standard voice pattern associated with each address number into a synthesized voice. For example, address number "00" is converted into voice signal "0 (zero)" and the next address  
15 number "20" is transformed into a voice signal "至急(shikyu; urgent)".

          In this fashion, the message playback operation is carried out in an address-by-address manner, namely, when the voice reproduction is finished for the pertinent address, the  
20 voice playback is conducted for a standard voice pattern of the next address. This process is sequentially and repeatedly accomplished up to the last address number. While the numeric characters and words are in general short, the fixed sentences have a relatively large size. When a long message  
25 or a message including many numeric characters is output continuously,

          the output voice of the message is not easy to hear and, depending on the message, it is difficult for the user to memorize the contents thereof. To prevent such a drawback, there is employed the following voice reproduction method.

30           In the flowchart of Fig. 3, "0" is set to N ( $N \neq 0$ ).

step 101) and then a message corresponding to the first address number is read from the pattern section 5 (step 102). A check is made to determine whether or not the message has been completely processed (step 103). If this is the case, the playback operation is finished; otherwise, whether or not the message is a fixed sentence is decided according to the address number (step 104). If the message is other than a fixed sentence, namely, for a message of a numeric character or a word,  $N = N + 1$  is set (step 106). Thereafter, confirming that  $N \geq 3$  (step 107), a check is made to determine the message of the next address number (step 108). When the subsequent message is a numeric character (step 110), control is returned to step 103 to similarly execute the operation described above.

In step 107, the number of address numbers are counted by the counter 9, and when  $N \geq 3$ , namely, when the address number indicates that three voice message portions are to be successively reproduced, a 3-second interval is disposed immediately after the pertinent message portion so as to halt temporarily the message reproduction (step 108). By means of this provision, when four or more voice message portions are to be reproduced, a 3-second interruption takes place after every third message portion to help the user to hear easily the voices of the message.

Moreover, when the message is a fixed sentence in step 104, a 3-second interval is also disposed immediately before the reproduction of the message so as to provide a demarkation between the preceding voice message and the succeeding message. Additionally, when the previous message is a numeric message and the subsequent message is other than



the numeric messages, namely, at a point where a numeric message terminates, a 3-second interval is similarly disposed for the user to easily memorize the numeric message.

5 As above, the messages stored in the storage 3, namely, the numeric characters, words, and fixed sentences are required to be sequentially reproduced with the 3-second interval inserted in the above locations between the message portions according to the procedure. Consequently, the entire voice message is not reproduced at once, and the resultant  
10 message can be easily understood by the user. By means of this provision, the user is not required to repeatedly reproduce the message to understand the contents thereof and hence the required playback time is reduced.

Description will now be given of an example  
15 of the above operation at reception of the message shown in Fig. 5. When a message " けいこ連絡したいことがある 0457196385 に電話をください (Keiko renraku shitai koto ga aru 0457196385 ni denwa o kudasai; Keiko, I have a message for you. Dial 0457196385)" is received, an address number  
20 corresponding to the message is stored as "272826532122230004 05070109060308052550" in the storage 3. When reproducing the message,  $N = 0$  is set (step 101) to reproduce a standard voice pattern "け(ke)" associated with the first address number "27" (step 102). Since this is a word,  $N = N + 1 = 1$  is set  
25 (step 106) to reproduce a standard voice pattern "い(i)" corresponding to the next address number "28". This is a word and hence  $N = N + 1 = 2$  is assumed to reproduce a standard voice pattern "こ(ko)" related to the next address number "26". Since this is a word,  $N = N + 1 = 3$  is attained.

30 In this point,  $N = 3$  and hence a 3-second

interruption of reproduction is provided after the playback of "こ(ko)" (step 108). Thereafter,  $N = 0$  is again set (step 101), and a voice pattern "連絡したい (renraku shitai; I have a message for you.)" corresponding to address number 5 "53" of the succeeding message portion is reproduced (step 102). Since this is a fixed sentence, a 3-second interruption of reproduction is provided thereafter (step 105).  $N = 0$  is set (step 101) to reproduce a pattern "こと(koto)" related to the next address number "21" (step 102). This is a word and hence  $N = N + 1 = 1$  is assumed (step 106) to reproduce a voice pattern "が(ga)" associated with address number "22" of the next message portion is reproduced (step 110). This is a word and hence  $N = N + 1 = 2$  is attained (step 106) to reproduce a pattern "ある(aru)" corresponding to address number 15 "23" of the subsequent message portion is reproduced (step 102). Since this is a word,  $N = N + 1 = 3$  is obtained (step 106). In this point, a 3-second interruption of reproduction is provided because of  $N = 3$  (step 108).  $N = 0$  is then set (step 101) to reproduce a pattern "0 (zero)" related to address number "00" of the next message portion 20 (step 102).

Repeating the procedure above, the remaining message portions of Fig. 5 are reproduced. As above, when a long message is received, an interval of time is automatically inserted in positions of the sentence according to the count value of the timer. Consequently, the user can easily 25 understand the message, either to memorize or to write down the contents thereof. Namely, the contents of the message can be correctly acquired and recognized. In consequence, it is rarely necessary for the user to repeatedly hear the message 30

beginning at the start position thereof. Therefore, the time required for such message reproduction can be dispensed with.

Fig. 6 is a flowchart showing another operation of the circuit of Fig. 2. When it is desired to hear a message, the user sets the switch 8 to the message playback mode and then initiates the message reproduction (step 200). Regardless of whether the pertinent message portion is a numeric character, word, or fixed sentence, when the user depresses Hold button 11 to stop the message reproduction, the controller 4 issues a voice playback stop instruction to halt temporarily the message playback operation (steps 201 and 202). When the user pushes Hold button 11 again, the control section 4 sends a voice playback instruction to the voice synthesizer 6. The synthesizer 6 produces a voice signal of the message and then sends the signal to the speaker 7, which in turn outputs a voice according to the signal (step 203). When the user does not depress Hold button 11, the message is reproduced (step 204).

By means of the above operation, voice reproduction, and the reproduction halt operation, can be conducted at any point during the playback operation of the entire message (step 205). When it is desired to stop the message reproduction, the user can stop the message reproduction at any point of the playback operation simply by depressing the Hold button 11. Consequently, in contrast with the conventional pager in which the user is required to repeatedly hear the entire message beginning at the first point thereof, the operability of a pager according to this embodiment of the present invention is improved considerably.

As described above, in a pager of voice reproduction

type in accordance with the present invention, when reproducing a received message, particularly, when reproducing a long message, a fixed interval of time is automatically provided at the above locations in the reproduced sentence to temporarily stop the voice message reproduction. This resultantly leads to an advantage that the user can easily hear and write down the message, and hence the contents thereof can be correctly acquired.

While the present invention has been described with reference to the particular illustrative embodiments, it is not to be restricted by those embodiments but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope of the present invention.

Each feature disclosed in this specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features.

The text of the abstract filed herewith is repeated here as part of the specification.

When a message stored in a storage is output as a voice by means of a speaker, a voice pattern section and a voice synthesizer, the kind of message is determined in order to automatically provide a fixed interval of time at intermediate points of the message reproduction according to the message type. In the reproduction of a long message, the user can easily hear and write down the resultant message.

## **CLAIMS**

1. A pager with vocal output, comprising:  
first storage means for storing therein a received message as a sequence of one  
5 or more codes;  
second storage means for storing therein a plurality of voice patterns, each  
voice pattern corresponding to a respective code;  
voice output means for processing a sequence of one or more voice patterns  
as they are sequentially output from the second storage means in accordance with said  
10 coded sequence to synthesize a voice signal and for responding to the voice signal to  
output a vocal output corresponding to the received message; and  
control means operative to control the voice output means such that said vocal  
output is interruptible.
2. A pager according to Claim 1, wherein the plurality of voice patterns  
15 includes a plurality of identified patterns; and  
wherein the control means is operative to count a number of processed  
identified patterns and to respond to the counted number to control the voice output  
means so that the vocal output is interrupted by a predetermined time interval.
3. A pager according to Claim 2, wherein the plurality of voice patterns  
20 includes a plurality of first identified patterns representative of alphanumerical  
characters, a plurality of second identified patterns representative of words and a  
plurality of third identified patterns representative of sentences; and  
wherein the control means is responsive to the counted number of processed  
second identified patterns to control the voice output means so that the vocal output  
25 is interrupted by a predetermined time interval.
4. A pager according to Claim 3, wherein the control means is responsive  
to a sequence of continuously processed first identified patterns to control the voice  
output means so that the vocal output is interrupted by a predetermined time interval.

5. A pager according to Claim 3 or Claim 4, wherein the control means is responsive to a processed third identified pattern to control the voice output means so that the vocal output is interrupted by a predetermined time interval.

5 6. A pager according to any of Claims 3 to 5 wherein the first, second and third identified patterns are identified in the second storage means by address data.

7. A pager according to any preceding claim wherein the control means includes a member for controlling the voice output means to interrupt voluntarily the  
10 vocal output.

8. A pager with vocal output comprising:  
storage means for storing therein a received message as a data item;  
standard voice pattern means loaded with voice patterns corresponding to message data items;  
15 voice synthesizer means for synthesizing a voice signal according to the data item stored in the storage means and the voice pattern loaded in the standard voice pattern means;  
a speaker for transforming the synthesized voice signal of the message into a vocal output and outputting the vocal output thereby reproducing the received  
20 message; and  
means for interrupting temporarily the vocal output.

9. A pager according to Claim 8, further including means for counting a number of voice patterns corresponding to a message to be reproduced and inserting a predetermined interval of time at an intermediate point of the reproduced voice  
25 according to the counted number.

10. A pager according to Claim 9, wherein the voice patterns may comprise patters may cause patterns of one or more alphanumerical characters, words, or sentences, wherein:

- 5        each of the voice patterns is assigned with a predetermined unique value; and  
      an interval of time is provided in the reproduced message each time a predetermined number of respective patterns are reproduced according to the unique value of each of the voice patterns.

11. A pager according to Claim 10, wherein;  
10        an address number preset in association with an input message is stored in the storage means; and  
      the nature of the alphanumeric character, word, or sentence is determined according to the address number and then said predetermined unique value is determined to provide the interval of time.

12. A pager according to any of Claims 8 to 11, further including a hold  
15        button, wherein when the hold button is depressed, the message reproduction is either temporarily interrupted or re-started.

13. A pager substantially as herein described with reference to and as shown in Figure 2 of the accompanying drawings.



The  
Patent  
Office

17

Application No: GB 9616023.9  
Claims searched: 1-13

Examiner: Mike Davis  
Date of search: 3 September 1996

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G4H (HRCU)

Int Cl (Ed.6): G08B

Other:

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2279476 A (NEC) whole document	1,8 at least
X	GB 2276745 A (CHIN-YUNG CHIANG) e.g. p.3 line 9 to p.4 line 18	.
X	WO 91/02433 A1 (MOTOROLA) e.g. p.9,17-20	.
X	WO 87/04309 A1 (MOTOROLA) e.g. p.22 line 19 to p.23 line 6	.

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.